
Reprogramming by lineage specifiers: blurring the lines between pluripotency and differentiation.

Journal: Curr Opin Genet Dev

Publication Year: 2014

Authors: Ignacio Sancho-Martinez, Alejandro Ocampo, Juan Carlos Izpisua Belmonte

PubMed link: 25461451

Funding Grants: Training in the Biology of Human Embryonic Stem Cells and Emerging Technologies II, Training in the Biology of Human Enbryonic Stem Cells and Emerging Technologies, Direct reprogramming towards vascular progenitors for the treatment of ischemia

Public Summary:

he generation of human induced pluripotent stem cells (iPS) has raised enormous expectations within the biomedical community due to their potential vast implications in regenerative and personalized medicine. However, reprogramming to iPS is still not fully comprehended. Difficulties found in ascribing specific molecular patterns to pluripotent cells (PSCs), and inherent inter-line and intra-line variability between different PSCs need to be resolved. Additionally, and despite multiple assumptions, it remains unclear whether the current in vitro culturing conditions for the maintenance and differentiation of PSCs do indeed recapitulate the developmental processes observed in vivo. As a consequence, basic questions such as what is the actual nature of PSCs remain unanswered and different theories have emerged in regards to the identity of these valuable cell population. Here we discuss on the published theories for defining PSC identity, the implications that the different postulated models have for the reprogramming field as well as speculate on potential future directions that might be opened once a precise knowledge on the nature of PSCs is accomplished.

Scientific Abstract:

The generation of human induced pluripotent stem cells (iPS) has raised enormous expectations within the biomedical community due to their potential vast implications in regenerative and personalized medicine. However, reprogramming to iPS is still not fully comprehended. Difficulties found in ascribing specific molecular patterns to pluripotent cells (PSCs), and inherent inter-line and intra-line variability between different PSCs need to be resolved. Additionally, and despite multiple assumptions, it remains unclear whether the current in vitro culturing conditions for the maintenance and differentiation of PSCs do indeed recapitulate the developmental processes observed in vivo. As a consequence, basic questions such as what is the actual nature of PSCs remain unanswered and different theories have emerged in regards to the identity of these valuable cell population. Here we discuss on the published theories for defining PSC identity, the implications that the different postulated models have for the reprogramming field as well as speculate on potential future directions that might be opened once a precise knowledge on the nature of PSCs is accomplished.

Source URL: <https://www.cirm.ca.gov/about-cirm/publications/reprogramming-lineage-specifiers-blurring-lines-between-pluripotency-and>